FINAL YEAR PROJECT REPORT

BACHELOR ENGINEERING (HONS)

(MECHANICAL ENGINEERING)

MARA INSTITUTE OF TECHNOLOGY

SHAH ALAM

TITLE :

THE ENVIRONMENTAL DEGRADATION OF ADHESIVE JOINT

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PREFACE

The main objectives of this project are:

1. To find the effect of environment to the adhesive joint under various condition. These conditions are:
    - Normal condition
    - Sun light condition
    - Sea water condition
    - Under ground condition
    - Normal water condition
2. To study the strength of adhesive under various conditions for different duration.
3. To monitor the mechanism of adhesive after tensile test.

CONTENT

1.0 INTRODUCTION

Adhesive joints are expected to retain a significant proportion of their load bearing capacity for the entire duration of the service life of the bonded structure. However, service conditions can often involve exposure to combinations of static or fatigue load and hostile environment (marine, hot/wet, weathering or chemical). It is therefore essential that the end user and the adhesive manufacture possess the necessary tools for selecting and characterising an adhesive system, to ensure reliability bond performance under hostile operating condition. Optimising joint performance requires an understanding on the failure mechanisms involved in environment degradation, and validated test methods and design methodologies suitable for predicting material degradation and life expectancy.

The general consensus is that wider used of adhesive technology has been impeded by a lack of reliable test methods, accelerated ageing procedures, quantitative data and predictive analysis for determining durability of structural adhesive joints to hostile environments.

User or designers must often expend considerable effort in selecting adhesive system and optimising process variables to maximise long term strength retention under hostile environments. The bonding process will often be determined by recommendation from the adhesive manufacturer, from previous experience or by an extensive range of durability test. Often, little or no attention is directed towards understanding the critical variables in the bonding process and their effect on the survival of the adhesive joint under the combined effects of environment and stress. The synergism of stress and